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| APPLICATION NO. | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO. | CONFIRMATION NO. |
|--|-------------|--------------------------|-----------------------------|------------------|
| 10/757,314 | 01/14/2004 | Mohammed Mahbubur Rahman | WJT08-0053 (JSF001-0002) | 3500 |
| 7590 | 08/31/2006 | | EXAMINER | |
| William J Tucker 14431 Goliad Drive Box #8 Malakoff, TX 75148 | | | HAM, SEUNGSOOK | |
| | | | ART UNIT | PAPER NUMBER |
| | | | | 2817 |

DATE MAILED: 08/31/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

| | | |
|------------------------------|-----------------|---------------|
| Office Action Summary | Application No. | Applicant(s) |
| | 10/757,314 | RAHMAN ET AL. |
| | Examiner | Art Unit |
| | Seungsook Ham | 2817 |

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --
Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1) Responsive to communication(s) filed on 24 June 2006.
 2a) This action is **FINAL**. 2b) This action is non-final.
 3) Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4) Claim(s) 1-7, 10, 12-19, 22 and 24 is/are pending in the application.
 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
 5) Claim(s) _____ is/are allowed.
 6) Claim(s) 1-7, 10, 12-19, 22 and 24 is/are rejected.
 7) Claim(s) _____ is/are objected to.
 8) Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9) The specification is objected to by the Examiner.
 10) The drawing(s) filed on _____ is/are: a) accepted or b) objected to by the Examiner.
 Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
 Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
 11) The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12) Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
 a) All b) Some * c) None of:
 1. Certified copies of the priority documents have been received.
 2. Certified copies of the priority documents have been received in Application No. _____.
 3. Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

| | |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ . |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____ . | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| | 6) <input type="checkbox"/> Other: _____ . |

DETAILED ACTION

Drawings

The drawings are objected to under 37 CFR 1.83(a). The drawings must show every feature of the invention specified in the claims. Therefore, "a ground plane connected to said bottom layer with an isolation in said bottom layer of said ground plane" as recited in claim 1 and 13 must be shown or the feature(s) canceled from the claim(s). No new matter should be entered.

Corrected drawing sheets in compliance with 37 CFR 1.121(d) are required in reply to the Office action to avoid abandonment of the application. Any amended replacement drawing sheet should include all of the figures appearing on the immediate prior version of the sheet, even if only one figure is being amended. The figure or figure number of an amended drawing should not be labeled as "amended." If a drawing figure is to be canceled, the appropriate figure must be removed from the replacement sheet, and where necessary, the remaining figures must be renumbered and appropriate changes made to the brief description of the several views of the drawings for consistency. Additional replacement sheets may be necessary to show the renumbering of the remaining figures. Each drawing sheet submitted after the filing date of an application must be labeled in the top margin as either "Replacement Sheet" or "New Sheet" pursuant to 37 CFR 1.121(d). If the changes are not accepted by the examiner, the applicant will be notified and informed of any required corrective action in the next Office action. The objection to the drawings will not be held in abeyance.

Claim Objections

Claims 10 and 22 are objected to because of the following informalities:

In claims 10 and 22, “input output lines” should be corrected to –said input and output transmission lines (see claims 1 and 13). Appropriate correction is required.

Claim Rejections - 35 USC § 112

The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

Claims 1-7, 10, 12-19, 22 and 24 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

In claim 1, lines 13-17, and claim 13, lines 12-16, “said microstrip-stripline reso[no]nator” lacks antecedent basis, and unclear as to how “said microstrip-stripline resonator” is related to first, second and third resonators. Moreover, “microstrip-stripline” is misleading since microstrip and stripline structure cannot be co-existed (examiner suggests amending the claim to --microstrip or stripline --).

Moreover, claims 1 and 13, “a ground plane connected to said bottom layer *with an isolation in said bottom layer of said ground plane*” confusing as to how the ground plane, an isolation, and bottom layer are related to each other (which figure shows such limitation?).

In claim 13, line 9, “said bottom layer” also lacks antecedent basis.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

Claims 1-3, 5-7, 10, 12, 13, 17-19, 22, and 24 are rejected under 35 U.S.C. 103(a) as being unpatentable over Peters (US '259) in view of Liang et al. (US 6,492,883) and Ammar et al. (US '404) (insofar as understood).

Peters (figs. 4A-4C) discloses a multilayer filter comprising: a first resonator 208a on a first (or top) dielectric layer 202c; a second resonator 206 coupled to the first resonator on a second (or bottom) dielectric layer 202b; and a third resonator 208b coupled to the second resonator and cross coupled to the first resonator; an input transmission line 207a connected to the first resonator; and an output transmission line 207b connected to the third resonator; and two ground planes 200, 203 are provided on upper and bottom planes. Moreover, a ground plane 203 connected to the bottom layer with an isolation (i.e., the bottom layer 202b has a second resonator 206 which one end is connected to the ground plane 203 through a conductor 201a, see fig. 4B). It should be noted that "top layer" or "bottom layer" is an relative term depends on a reference point. Thus, the first dielectric layer 202c can be a top layer if the ground plane 203 is considered as a top/upper plane.

Peters does not show a voltage variable capacitor is coupled to at least one of the resonators, DC bias ports, and the first and second resonators are disposed on a LTCC (low-temperature co-fired ceramic).

Liang et al. (figs. 6-9) discloses a similar combline filter having voltage variable capacitors coupled to resonators to tune each resonant frequency or the center frequency of the filter and also teaches using tunable capacitors in a filter to tune the resonant frequency (col. 5, lines 14-25). Moreover, Liang et al. teaches that tunable duplexers (e.g., filters) can cover larger frequency band than *fixed* duplexers (col. 9, line 63 – col. 10, line 6). Furthermore, DC bias circuit 78 (see fig. 6) for tuning the variable capacitor which has a DC bias port to feeding the DC signal.

Ammar et al. (figs. 7-9) discloses a multilayer filter having a plurality of resonators 54 formed on LTCC layers.

It would have been obvious to one of ordinary skill in the art to provide a voltage tunable variable capacitors of Liang et al. with a DC bias port coupled to each of resonator in the device of Peters to tune in different frequencies (including the center frequency) for fast tuning capability, small size as well as improve the insertion loss as shown by Liang et al. (col. 5, lines 11-26, col. 6, lines 45-67), and also forming the first and second resonators on a LTCC in the modified device of Peters to obtain a high “Q” filters in a small spaces and lower manufacturing tolerances as taught by Ammar et al. (col. 1, line 31 – col. 2, lines 13).

Providing nine layers of LTCC is considered as an obvious design modification since Ammar shows LTCC is made of a plurality of co-fired ceramic layers (col. 3, lines 53-65).

Claims 4 and 14-16 are rejected under 35 U.S.C. 103(a) as being unpatentable over Peters (US '259) in view of Liang et al. (US 6,492,883) and Ammar et al. (US '404) as applied to claims 1-3, and 13 above, and further in view of Pickett (US '499).

The modified device of Peters does not show biasing circuit having a resistor and/or DC blocking capacitor. However, such design technique is well known in the art. Pickett (figs. 1-4) discloses a voltage control tunable filter having a DC bias circuit having a resistor 22 and a DC blocking capacitor 30, 102 (col. 3, lines 13-28). It would have been obvious to one of ordinary skill in the art to provide a resistor and/or DC blocking capacitor in the modified device of Peters to eliminate undesired parasitic tuning or coupling as taught by Pickett (col. 2, lines 6-30).

Response to Arguments

Applicant's arguments filed on 6/24/06 have been fully considered but they are not persuasive.

The applicant argues that "Liang nor any of the cited art discloses, suggests or teaches the included and claimed elements necessary for the LTCC based electronically tunable multilayer microstrip-stripline combine filter (e.g., the left, right, center bias ports as well as the isolated ground plane)" (see REMARKS, P. 9, middle paragraph). The examiner respectfully disagrees.

It should be noted that the examiner already response to the applicant's argument on obviousness of using LTCC layers in view of Ammar et al. (see last Office Action mailed on 3/24/06, p. 5, first and second paragraphs). Moreover, the applicant

failed to specifically point out why it would not be obvious to use LTCC based layers from the teaching from Ammar et al.

Regarding providing a DC bias *port* to the left, right and center resonators, it is the inherent feature of using a voltage tunable variable capacitor. Liang et al. (fig. 6) clearly shows a DC bias circuit 78. Liang et al. also teaches that each resonator line has a bias circuit (col. 4, line 44), thus each resonator is connected to the DC bias circuit which inherently has a DC bias *port* to pass the signal. Thus, it is the examiner's position that providing DC bias ports to each resonator is an inherent feature of using voltage tunable variable capacitor of Liang et al. in the device of Peters.

Moreover, the applicant refers to the specification, page 12, lines 3-14 as the unique characteristics of using voltage tunable varactor and multilayered structure. However, this portion of the specification refers to the advantage of multilayered combline cross coupling structure, which is clearly shown by Peters. Thus, the applicant's remark is not persuasive.

Conclusion

Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within

TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Seungsook Ham whose telephone number is (571) 272-2405. The examiner can normally be reached on Monday-Thursday, 8:00AM-5:00PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Robert Pascal can be reached on (571)-272-1769. The fax phone number for the organization where this application or proceeding is assigned is **571-273-8300**.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).



Seungsook Ham
Primary Examiner
Art Unit 2817

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